FEMA Emergency Management Institute

Graduate Level College Course Development Project

Coastal Hazards Management:
Brief Course Outline Revised 10/25/04 djb

Section One *Introduction*
I. Introductions
II. Overview of the Course

Section Two *The Nature of the Coast*
I. The Natural Coast
II. Natural Hazards

Section Three *Humans and the Coast*
I. The Human Coast
II. Governance of the Coast
III. Technological and Human Induced Hazards

Section Four *Disasters*
I. Definition
II. Distinguished from Hazards
III. The Mantra
IV. Examples of Disasters

Section Five *Managing the Coast*
I. Values and Mitigation
II. Managing Development in the Coastal Zone
III. Mitigation Planning

Section Six *Conclusions*

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COASTAL HAZARDS MANAGEMENT
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Session One

SECTION ONE INTRODUCTION

The fundamental objective of this section is to make the students (and the instructor) comfortable in the class and with the materials.

This can be accomplished by the instructor introducing him/herself and then asking each student to introduce themselves. It might be interesting to ask the students to describe their experiences with the coast (a particular coast if relevant) and with natural hazards. Then the instructor should go through the brief course outline with the students to explain the logic of the course and then discuss the details of the materials e.g. what is required, where materials are available, etc. as well as what will be expected of them.

I. Introductions
   - A. Students and instructors
   - B. Materials

II. Overview of the course (lecture and slides)
   - A. Purpose
   - B. Process (logic)
     1. There are more and bigger disasters
     2. The main reason is not that there are more natural hazards (although there may be) but is that there is more development in the coastal zone that is vulnerable to natural hazards.
     3. There is nothing we can do about the hazards; we cannot make them go away, we cannot diminish them
     4. We can do something about the development; we can cause it to be built in safer places and we can cause it to be built to be more resilient to natural hazards
     5. Therefore we should manage coastal development

in a way to make the coastal zone less vulnerable. to natural hazards

C. Content

1. Use the brief outline to explain how the course will do this.
2. Course Process (syllabus)

Session Two

SECTION TWO THE NATURE OF THE COAST

The title of this course is “Coastal Hazards Management”. This is a misnomer because the course will neither teach the students how to manage “the coast” nor how to manage “hazards”. But what the course will do is teach the students how to manage what we human beings do in the coastal zone to make us and our structures less vulnerable to the impacts of natural hazards that occur in the coastal zone. This requires an understanding of the coast, coastal process, and the natural systems (including natural hazards) that shape, and in fact are, the coastal zone. So the purpose of this section of the course is to give the students an understanding of the physical coast and the natural hazards that are a part of the coastal zone.

I. The Natural Coast

A. Natural processes, boundaries, ecosystems and river basins, human impacts e.g. inlet stabilization, beach nourishment, dams, levees, impervious surfaces, etc.

B. Types of Coasts

1. Rocky Shores

Session Three

2. Sandy Shores

Session Four

3. Estuarine Ecosystems

Session Five

4. Coral reefs

Sessions Six and Seven

II. Coastal Hazards

A. Distinguish hazards from disasters
B. Frequency, forecasting, probability.

Session Eight

C. Meteorological Hazards
    1. Single element meteorological hazards
        a. Rain
        b. Freezing rain
        c. Hail
        d. Snow
        e. Wind
        f. Lightning
        g. Temperature
        h. Fog
    2. Compound meteorological hazards
        a. Rain and wind storms
        b. Thunderstorms
        c. Tornadoes
        d. Hurricanes
        e. Blizzards
        f. Drought

D. Hydrological
    1. Flooding
    2. Wave action
    3. Sea ice and icebergs
    4. Runoff
    5. Drought
    6. Glacier advance
    7. Storm Surge
    8. Tsunamis
    9. Dam failure

Session Nine

E. Geological
    1. Earthquakes
    2. Volcanic eruptions
    3. Shifting sands
    4. Silting (dikes, rivers, dams, harbors, etc)
    5. Erosion

6. Mass-movements (landslides, avalanches, debris flow, mud flow, subsidence)

Session Ten

F. Sea level rise

SECTION THREE HUMANS AND THE COAST

The natural environment (the physical coast and natural hazards) are, of course, key elements of our discussion. However, another key element is us; Human beings. The purpose of this section is to explore the presence of human beings in the coastal zone, what they do there, their institutions, how they govern themselves and how they manage development. Technological and human induced hazards, both of which are products of human activity, as distinguished from natural hazards, are also discussed in this section.

Session Eleven

I. The Human Coast
   A. Population trends
   B. Demographics
   C. Settlement patterns
   D. Economic activity
   E. Demands/market
      1. Aesthetics
      2. Recreation
      3. Equity

Session Twelve

II. Governance of the Coast
   A. The federal system
   B. Federal government
   C. State government
   D. Local government
   E. Regional government

Session Thirteen

E. Institutions

1. Legislative
2. Executive
3. Judicial

F. Policy
1. Constitutions
2. Statutes and ordinances
3. Regulations
4. Judicial decisions
5. Guidances

G. Jurisdictions
1. Geographic jurisdictions
2. Substantive jurisdictions

Session Fourteen

III. Technological and Human Induced Hazards

A. Technological (unintended) hazards
1. Ports and shipping
2. Other transportation
3. Industry
4. Hazardous materials
5. Defense
6. Oil and natural gas
7. Power outages

Session Fifteen

B. Biological and Anthroprogenic (intentional) Hazards

Session Sixteen

SECTION FOUR DISASTERS

The purpose of this section is to introduce the concept of disasters, and that disasters are not the necessary result of natural hazards but occur only when natural hazards intersect with the built environment, particularly poorly located or poorly constructed development.

The mantra: Natural Hazards are a part of the natural environment. Disasters are not. Disasters occur only when a natural hazard (a part of the natural coast) intersects with the built environment (the human coast). Natural hazards cannot be managed. The

characteristics of the built environment can be managed. Therefore the only thing that can be done to lessen the impact of natural hazards is to manage the built environment so that it is less vulnerable to natural hazards. This is called “growth management”; or in the coastal zone it is often called “coastal management” or “coastal zone management.

I. Definition
II. Distinguished from hazards
III. The Mantra

Sessions Seventeen, Eighteen and Nineteen

IV. Case examples of disasters emanating from major natural Hazards

Sessions Twenty and Twenty One

SECTION FIVE MANAGING THE COAST TO MAKE IT LESS VULNERABLE TO THE IMPACT OF NATURAL HAZARDS

The purpose of this section is to teach the students how to manage development in the coastal zone so that it is less vulnerable to the impacts of natural hazards.

There are four objectives:

1. To gain an understanding of the values involved in the decision to manage coastal development and an understanding of the six most prevalent perspectives of desirable urban growth
2. To gain an understanding of the concept of mitigation and strategies that can be used to mitigate the impacts of natural hazards
3. To gain an understanding of the policies, the tools and techniques, programs and projects that can be used to achieve a lessening of vulnerability to natural hazards, (carry out the strategies) and
4. How to formulate a plan to put the values, the concept, the strategies and the policies together to, in fact, bring about the desired result.

I. Values

A. Environmental ethics

Sessions Twenty Two and Twenty Three

B. Alternative Perspectives of urban development

1. The market
2. Urban planning
3. The new urbanism
4. Smart growth
5. Regional Planning
6. Biodiversity
7. Sustainable development

Session Twenty Four

C. Mitigation

1. The Mantra revisited (mitigation as a societal value)
2. Definition
    a. Mitigation in general
    b. Structural mitigation
    c. Non-structural mitigation
    d. Programmatic mitigation
    e. Mitigation projects
3. Mitigation strategies (see handout 24.1)
    a. The built environment
        1. Existing structures(correcting mistakes)
            a. Redevelopment (including relocation)
                1. disaster induced
                2. mc mansionization
            b. Retrofiting
        2. Undeveloped land in developing areas (avoiding mistakes)
            a. Avoidance: manipulate the characteristics of development: location, density, etc

b. Resilience: manipulate the design and construction of buildings

b. The natural (unbuilt) environment

1. Preservation
2. Conservation
3. Restoration
4. Ecosystem management
5. River basin management

4. Introduction to the concept of mitigation planning. All mitigation is local and other myths

Session Twenty Five

D. Preparation for Field Work

Session Twenty Six

II. Managing Development in the Coastal Zone: Carrying Out the Strategies

A. Overview

B. Institutions that manage the coastal zone

1. Private
   a. Land owners and investors
   b. Property (owners) rights and duties
   c. Public Trust Doctrine
2. Non-governmental organizations
   a. Land owners and managers
   b. Policy formulation
   c. Practice
3. Governments (*Reprise of Session Twelve Governance of the Coast*)
   a. Federal
   b. State
   c. Local
   d. Regional

C. Policy: An Overview (management tools and techniques used to manage the coastal zone)

1. Types (*Reprise of Session Thirteen*
   a. Constitution
   b. Statutes

c. Regulations
d. Cases
e. Guidance

2. Intended vs. unintended consequences
3. Multiple objectives of policy

Session Twenty Seven

D. Federal Emergency Management Agency

1. Overview
2. Public Assistance
3. Individual Assistance

Session Twenty Eight

4. HMGP
5. DMA
6. PDM

Session Twenty Nine

7. NFIP

Session Thirty

E. Coastal Zone Management Act

1. National grants to states
2. Consistency
3. State coastal management programs
   a. CAMA type
   b. Networked

Sesssion Thirty One

F. CBRA
G. State forms of CBRA
H. NEPA

Session Thirty Two

I. Clean Water Act
J. US Army Corps of Engineers

Session Thirty Three

K. Endangered Species Act (Florida Key Deer case) (HCP)

L. National Seashores
M. National Forests
N. Department of Defense
O. Internal Revenue Code

Session Thirty Four

P. State Policy
1. Emergency management
2. Coastal management
3. CBRA
4. SEPA
5. Water Quality

Session Thirty Five

Q. Local Policy (Explain Dillion's Rule)
1. Regulation
a. Zoning
b. Subdivision regulation
c. Building codes
d. Flood Damage Prevention Ordinances
2. Acquisition and management of land
a. Parks and open space
b. Restoration

Session Thirty Six

3. Taxation
a. Real property tax
b. Special district tax (hazardous area tax)
c. Income tax (federal tax with local impact)
4. Spending
a. Capital budget
b. Capital improvements program
c. Infrastructure planning
5. Education
a. Disclosure
b. "Living with the shore"

G. Regional Policy: Chesapeake Bay, APES, Tahoe, APA, CAMA

Session Thirty Seven (make assignments for subsequent sessions)

III. Mitigation Planning: Planning to Mitigate the Impacts of Natural Hazards in the Coastal Zone

A. Reprise of the Disaster Mitigation Act requirements including the state plan requirement and the local plan requirements. State requirements. Introduction to planning. Overview of mitigation planning (the tree). Instructor presents a real or hypothetical place upon which the next several sessions will depend.

Session Thirty Eight (presentations: students present hazards and discuss vulnerability exposure, probability, magnitude and risk.)

B. The Mitigation Planning Process

1. Identify potential natural hazards that may likely affect your community (exercise and class presentation)
2. Assess vulnerability e.g. where might the Hazard(s) strike, exposure e.g. if a natural hazard strikes, then what areas e.g. population, property and/or economic activity exists in the vulnerable areas and may be affected by it (them), probability, how likely is it that a hazard will hit; and magnitude, how large or powerful is this hazard likely to be. The concept of risk combines all of these factors. (exercise and class presentation)

Session Thirty Nine (presentations: students are assigned areas of capability to present and discuss)

3. Assess community capability: what legal, political and fiscal ability does the community have to limit its exposure to natural hazards; this is largely a reprise of policy (above) but includes a discussion of political, social and fiscal factors affecting capability.

Session Forty (lecture, presentations, discussion: students take sides and debate. The instructor might assign positions to defend.)

4. Interim conclusions: what should we do? should we just hope for the best and do nothing? or should we try to reduce or at least limit exposure now and in the future?
5. Establish values and goals.

Session Forty One (the class as a whole divides the community into areas and then teams meet to discuss values, goals and strategies for their area; at the end of class each team summarizes their interim conclusions)

6. Establish planning areas: it may be easier to deal with areas of the community rather than with the community as a whole.
7. For each planning area:
    a. Establish values and goals
    b. Formulate strategies

*Session Forty Two (presentations: the teams present final values, goals and strategies, policies to carry out those strategies, and assign responsibility for executing the policie*s)

c. Develop policies to carry out the strategies
d. Assign responsibility for implementing the policy

Session Forty Three (presentations: the teams discuss how their community will monitor, evaluate and report progress on executing the plan and will revise and update it. They will also discuss methods for insuring that the plan is adopted)

8. Establish procedures for monitoring, evaluating and reporting progress
9. Establish procedures for revisions and updates
10. Adopt the plan

Session Forty Four

SPARE

Session Forty Five

SECTION SIX CONCLUSIONS

The purpose of this section is to tie the course all together. To reiterate the most important points and to insure that the students understand the relationships established during the course.

I. Revisit the Mantra
II. There is a clear choice: repeat the “mistakes” of the past or take steps to build a more resilient community that will be less exposed to the impacts of natural hazards.
III. Political issues
IV. It is not a question of all or nothing: understanding the problem and commitment to solving it are important.